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(21)Application number : **08-305737**                      (71)Applicant : **SEIKO EPSON CORP**

(22)Date of filing :                      **30.10.1996**                      (72)Inventor : **MIYAKE HIDEOKI**

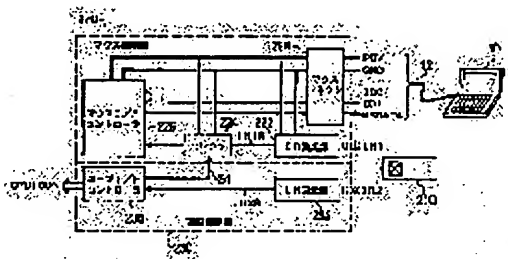
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## (54) PICTURE DISPLAY DEVICE

### (57)Abstract:

PROBLEM TO BE SOLVED: To make it possible to use an operating means for inputting information to a computer irrespective of the sequence of starting of the device in a picture display device.

SOLUTION: Sources PCV and GND are supplied to a mouse connector 228 via a connecting cable 12 from a PC 10. These sources PCV, GND are defined as sources to operate each block forming a mouse function part 220, i.e., an IR light receiving part 222, selector 224 and mouse I/F controller 226. Thus, source is supplied to each configuration part of the mouse function part 220 at the almost same time as the starting of the PC 10, and they are to be operable. At this time, the PC 10 checks a prescribed signal which is included in a mouse data signal MSDATA and confirms whether or not to be in a mouse operable state. Thus, the mouse function is used as well as the PC 10 is started irrespective of that the picture display device is operated or not.



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CLAIMS

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[Claim(s)]

[Claim 1] With the 1st receive section which receives the 1st actuation signal outputted from an actuation means to be the image display device which displays the picture signal outputted from a computer using a liquid crystal panel, and to output predetermined information The 1st signal generation section which creates and outputs the 1st signal which tells said computer from the 1st input signal which received in said 1st receive section, The power source of a preparation, said 1st receive section, and said 1st signal generation section is an image display device characterized by constituting and becoming so that it may be supplied from said computer through the cable which connects said computer and said image display device.

[Claim 2] The image display device characterized by having the 2nd signal generation section which creates and outputs the 2nd signal used within said image display device from the 2nd input signal which is an image display device according to claim 1, and received in the 2nd receive section which receives the 2nd actuation signal outputted from said actuation means, and said 2nd receive section.

[Claim 3] It is the image display device [claim 4] which is an image display device according to claim 1 or 2, and is characterized by said actuation means being a remote-operation means. The image display device characterized by being an image display device according to claim 3, and the 1st actuation signal and the 2nd actuation signal which are outputted from said remote-operation means being an infrared signal [claim 5] The image display device characterized by having the signal invalid section which is an image display device according to claim 4, and makes an invalid one side of said 1st or 2nd input signal based on a predetermined signal.

[Claim 6] The signal invalid section according to claim 5 is an image display device [claim 7] characterized by repealing said 1st input signal when said 2nd signal is used in said image display device. It is the image display device [claim 8] characterized by being an image display device according to claim 1 or 2, and said 1st signal generation section outputting said 1st signal to said computer outputted from said computer by the signal of the format corresponding to said computer based on the information on a proper. The image display device characterized by having the circuit section which outputs a connection signal to said computer in the image display device connected with a computer by the cable while current supply is carried out from said computer through said cable.

[Claim 9] Said circuit section is an image display device [claim 10] according to claim 8 characterized by connecting with the mouse terminal of said computer through said cable. Said circuit section is an image display device according to claim 8 characterized by having the receive section which receives the signal from the remote control for image display devices, and having the control section which emulates the mouse function of said computer with the signal from said remote control for image display devices.

[Claim 11] Said circuit section is an image display device [claim 12] according to claim 10 characterized by having the means which changes the 1st remote control signal which operates an image display device by remote control, and the 2nd remote control signal which operates the mouse function of a computer by remote control. The image display device characterized by having a means to output a

mouse functional connection signal to said computer through said cable in the image display device connected with the mouse terminal of a computer by the cable when said computer starts [claim 13] It is the image-display system [claim 14] characterized by to have a means output a connection signal to said computer, a means receive the signal from said remote controller, and the control means that emulates the mouse function of said computer with the signal from said remote controller while current supply of said image display device is carried out from said computer in the image-display system which comes to have the image display device connected with a computer and this computer by the cable, and the remote controller which operates this image display device by remote control. The image display device characterized by having a means by which this image display device outputs the signal to which power-source OFF also makes usable said mouse function for computers of said remote control by power-source ON of a computer in the image display device operated by remote control with the remote control which has a mouse function for computers

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to an image display device equipped with a remote-operation means to transmit the input to a computer especially using infrared radiation, about the image display device which displays the image outputted from a computer.

[0002]

[Description of the Prior Art] In the meeting, the announcement, etc., an explainer etc. displays the image outputted from a computer using a projection mold image display device (image display device which reappears to a liquid crystal panel, and projects and displays the reappearance image on a screen), and is making explanation, an announcement, etc. It is used to such a projection mold image display device in many cases, installing the computer which is the source of an output of an image in the location distant for a while. For the improvement in user-friendliness of a user in such an installation condition, there is usually an image display device equipped with the function (mouse function) as a pointing device of a computer. This mouse function is attained by the configuration by the interconnection cable which connects between infrared remote control, the circuit with which the image display device was equipped, and which receives infrared radiation and generates a mouse signal, the output connector which outputs the generated mouse signal, and this output connector and the mouse connection connectors of a computer. If outgoing radiation of the infrared signal is carried out to the light sensing portion of an infrared signal with infrared remote control while a user gives explanation of the screen displayed on the screen etc. at this time, the signal according to the mouse interface specification of a computer will be generated, and it will be outputted to a computer. And a mouse pointer is displayed on the location on the screen corresponding to the signal. It is possible for this to specify the location of the arbitration on a screen.

[0003]

[Problem(s) to be Solved by the Invention] Usually, when it confirms whether the mouse is connected at the time of an equipment startup and connection is able to be checked, a computer performs initial setting so that the mouse can be used. The following troubles occur in the mouse function by the above configurations.

[0004] Since the image display device will not have started a computer yet although it performs the connection confirm of the mouse for image display devices at the time of the initialization if a startup of a computer is started in the condition that the image display device has not started yet, it will be recognized as the mouse for image display devices not being connected effectually. Therefore, since a computer does not perform initial setting which makes a mouse usable, even if it starts an image display device after that, it cannot use the mouse function of an image display device. For this reason, when using the image display device which has such a mouse function, the sequence [ image display device / a computer and ] of an equipment startup will be limited, and an improvement was desired in respect of user-friendliness. Such a problem was a problem common to the actuation means not only a means to have a mouse function but for, generally inputting a certain information into a computer.

[0005] This invention is made in order to solve the above-mentioned technical problem in the conventional technique, and it aims at offering the image display device which makes usable the actuation means for not being concerned in order of an equipment startup, but inputting information into a computer.

[0006]

[The means for solving a technical problem, and its operation and effectiveness] In order to solve a part of above-mentioned technical problem [ at least ], the 1st invention With the 1st receive section which receives the 1st actuation signal outputted from an actuation means to be the image display device which displays the picture signal outputted from a computer using a liquid crystal panel, and to output predetermined information The 1st signal generation section which creates and outputs the 1st signal which tells said computer from the 1st input signal which received in said 1st receive section, The power source of a preparation, said 1st receive section, and said 1st signal generation section is characterized by constituting and becoming so that it may be supplied from said computer through the cable which connects said computer and said image display device.

[0007] Since the power source of said 1st receive section and said 1st signal generation section is the configuration supplied from a computer, the 1st receive section and the 1st signal generation section are not concerned with the existence of operation of an image display device, but are that said 1st receive section and said 1st signal generation section can also be operated with a startup of a computer. Therefore, the image display device which makes usable the actuation means for not being concerned in order of an equipment startup, but inputting information into a computer can be offered.

[0008] The 1st above-mentioned invention You may make it have the 2nd signal generation section which creates and outputs the 2nd signal used within said image display device from the 2nd input signal which received in the 2nd receive section which receives further the 2nd actuation signal outputted from said actuation means, and said 2nd receive section.

[0009] According to the above-mentioned configuration, the 2nd signal used within an image display device from the 2nd input signal which received in the 2nd receive section is generable. For example, this 2nd signal can be used as a control signal of the menu screen which sets up the operating condition of an image display device etc.

[0010] You may make it said actuation means of the 1st invention be a remote-operation means.

[0011] If it carries out like this, since an actuation means will be remote operation, a user-friendly image display device is realizable.

[0012] Moreover, you may make it the 1st actuation signal and the 2nd actuation signal which are outputted from said remote-operation means be an infrared signal.

[0013] If it carries out like this, since the actuation signal outputted from a remote-operation means will be infrared radiation, an image display device is realizable with a simple configuration.

[0014] It is desirable to have the signal invalid section which makes an invalid one side of said 1st or 2nd input signal based on a further predetermined signal in the above-mentioned case.

[0015] The infrared radiation with which outgoing radiation of the actuation signal was carried out towards one of the 1st or 2nd receive section from the remote-operation means (infrared remote-operation means) which is infrared radiation also irradiates the receive section of another side, and may generate an input signal. And the 1st or 2nd signal generated from this input signal will cause malfunction of equipment. For example, the 2nd actuation signal (infrared signal) by which outgoing radiation was carried out towards the 2nd receive section from the infrared remote-operation means also irradiates the 1st receive section, and generates the 1st input signal. By this, the 1st signal will be generated in the 1st signal generation section, it will be outputted to a computer, and malfunction of a computer will be caused. Since the input signal generated in the receive section of another side can be made into an invalid according to the above-mentioned configuration, such malfunction can be prevented.

[0016] Moreover, when said 2nd signal is used in said image display device, as for said signal invalid section, it is desirable to repeal said 1st input signal.

[0017] The 1st input signal generates the 1st signal in the 1st signal generation section, and is outputted

to a computer. This 1st signal is used as information, such as positional information and screen selection information, in a computer. Therefore, when the 1st input signal is accidentally outputted from the 1st receive section by the 2nd infrared signal, the 1st signal generated in the 1st signal generation section will be outputted to a computer, and will cause malfunction in a computer. Since the 1st signal generated accidentally is not outputted to a computer according to the above-mentioned configuration, malfunction in a computer can be prevented.

[0018] Moreover, as for said 1st signal generation section, in the 1st above-mentioned invention, it is desirable to output said 1st signal to said computer outputted from said computer by the signal of the format corresponding to said computer based on the information on a proper.

[0019] If it carries out like this, based on the information on the proper outputted from the computer connected to an image display device, the 1st signal can be automatically made into the signal of the format corresponding to a computer.

[0020] In the image display device connected with a computer by the cable, it is characterized by having the circuit section which outputs a connection signal to said computer while current supply of the 2nd invention is carried out from said computer through said cable.

[0021] Since current supply of the circuit section which outputs a connection signal is carried out to a computer from a computer through a cable according to the 2nd invention, it cannot be concerned with the existence of operation of an image display device, but a connection signal can be outputted to a computer. Therefore, the image display device which is not concerned in order of equipment starting, but makes a connection signal usable can be offered.

[0022] As for said circuit section, in the 2nd above-mentioned invention, it is desirable to connect with the mouse terminal of said computer through said cable.

[0023] If it carries out like this, the mouse function of a computer is realizable with the connection signal outputted from the circuit section.

[0024] Moreover, as for said circuit section, in the 2nd above-mentioned invention, it is desirable to have the receive section which receives the signal from the remote control for image display devices, and to have the control section which emulates the mouse function of said computer with the signal from said remote control for image display devices.

[0025] If it carries out like this, the signal from the remote control for image display devices can be emulated to the signal corresponding to the mouse function of a computer to connect through a cable.

[0026] Moreover, as for said circuit section, in the 2nd above-mentioned invention, it is still more desirable to have the means which changes the 1st remote control signal which operates an image display device by remote control, and the 2nd remote control signal which operates the mouse function of a computer by remote control.

[0027] If it carries out like this, only one of the signals of the 1st remote control signal and the 2nd remote control signal are confirmed, and it can choose whether an image display device is operated by remote control with the 1st remote control signal, or the mouse function of a computer is operated by remote control with the 2nd remote control signal.

[0028] In the image display device connected with the mouse terminal of a computer by the cable, 3rd invention is characterized by having a means to output a mouse functional connection signal to said computer through said cable, when said computer starts.

[0029] Since according to the 3rd invention a mouse functional connection signal can be outputted to a computer through a cable when a computer starts, a computer can be recognized as a mouse function being usable. Therefore, the image display device which is not concerned in order of equipment starting, but makes a mouse function usable can be offered.

[0030] In the image display system which the 4th invention is an image display system and comes to have the image display device connected with a computer and this computer by the cable, and the remote controller which operates this image display device by remote control While current supply of said image display device is carried out from said computer It is characterized by having a means to output a connection signal to said computer, a means to receive the signal from said remote controller, and the control means that emulates the mouse function of said computer with the signal from said

remote controller.

[0031] Since current supply of a means with which said image display device is equipped output a connection signal to a computer, a means receive the signal from a remote controller, and the control means which emulates the mouse function of said computer with the signal from a remote controller is carried out from a computer according to the 4th invention, it cannot be concerned with the existence of operation of an image display device, but it can operate, and the signal from a remote controller can be emulated to the signal corresponding to the mouse function of a computer, and can output to a computer. Therefore, the image display system which is not concerned in order of equipment starting, but makes a mouse function usable can be offered.

[0032] 5th invention is characterized by having a means by which this image display device outputs the signal to which power-source OFF also makes usable said mouse function for computers of said remote control by power-source ON of a computer in the image display device operated by remote control with the remote control which has a mouse function for computers.

[0033] According to the 5th invention, an image display device can offer the image display device to which it is not concerned in order of an equipment startup, either, but makes a mouse function usable by power-source ON of a computer since power-source OFF can also make usable the mouse function for computers of remote control.

[0034]

[Embodiment of the Invention] Next, the gestalt of operation of this invention is explained based on an example. Drawing 1 is the block diagram showing the circuitry of the projection mold indicating equipment (image display device) by the example of this invention.

[0035] This image display device is equipped with the video amplifier 110 of three channels, ADC120 of three channels, the digital video processor 130, DA converter (it abbreviates to DAC hereafter) 140 of three channels, three liquid crystal (it abbreviates to LCD hereafter) drivers 150R, 150G, and 150B, driver control circuits 155, three LCD panels 160R, 160G, and 160B, the synchronous detector 170, the PLL circuit 180, and CPU190.

[0036] The analog picture signals RIN (red), GIN (green), and BIN (blue) from a computer are first inputted into the video amplifier 110 of three channels. Video amplifier 110 changes the amplitude and direct current level of the analog picture signals RIN, GIN, and BIN, and outputs them as analog picture signals RA, GA, and BA according to the input specification of ADC120 connected to the latter part.

[0037] ADC120 is the timing of the sampling clock ADCLK mentioned later, and changes and outputs the inputted analog picture signals RA, GA, and BA to the digital image data RD, GD, and BD. Here, although the conversion precision of the changed digital image data RD, GD, and BD changes with foreground colors to which image display corresponds, it is usually about 3-8 bits, respectively. The digital image data RD, GD, and BD are inputted into the data-conversion circuit 132 in the digital video processor 130.

[0038] The data-conversion circuit 132 once carries out the buffer (storage) of the inputted digital image data RD, GD, and BD, and outputs the digital LCD data RDT, GDT, and BDT changed into the clock frequency (set up by the control signal DATCNT mentioned later) which can be displayed on the LCD panels 160R, 160G, and 160B. The LCD data RDT, GDT, and BDT are inputted into DAC140.

[0039] DAC140 changes and outputs the inputted LCD data RDT, GDT, and BDT to the LCD signals RAT, GAT, and BAT of an analog again. The LCD signals RAT, GAT, and BAT are inputted into each LCD drivers 150R, 150G, and 150B.

[0040] The LCD drivers 150R, 150G, and 150B are controlled by the timing clock LCDCLK outputted from the driver control circuit 155, and change and output the inputted LCD signals RAT, GAT, and BAT to the LCD drive data RATD, GATD, and BATD which drive each LCD panels 160R, 160G, and 160B. Here, the driver control circuit 155 generates the timing clock LCDCLK for the LCD drivers 150R, 150G, and 150B to output the LCD drive data RATD, GATD, and BATD to each LCD panels 160R, 160G, and 160B based on timing signal LCDTRG which shows the timing of the LCD data RDT, GDT, and BDT outputted from the data-conversion circuit 132.

[0041] Each LCD panels 160R, 160G, and 160B modulate the light of each color by which incidence



was carried out to each LCD panels 160R, 160G, and 160B according to the inputted LCD drive data RATD, GATD, and BATD. In addition, the light of each color by which incidence was carried out to each LCD panels 160R, 160G, and 160B is the light by which outgoing radiation was carried out from the light source which is not illustrated. Each modulated colored light is compounded by one, and with the projector lens which does not form and illustrate an image, it is projected on a screen, and an image is expanded and it is displayed.

[0042] Vertical Synchronizing signal Vsync showing Horizontal Synchronizing signal Hsync and the vertical synchronous timing which, on the other hand, express the horizontal synchronous timing of the picture signal from a computer is inputted into the synchronous detector 170. The synchronous detector 170 shapes Horizontal Synchronizing signal Hsync and Vertical Synchronizing signal Vsync in waveform, and outputs the horizontal synchronization data HD and the vertical-synchronization data VD. The horizontal synchronization data HD and the vertical-synchronization data VD are inputted into the above-mentioned data-conversion circuit 132 and CPU190, and are used as data timing until the buffer of the digital image data RD, GD, and BD is carried out to the above-mentioned data-conversion circuit 132.

[0043] PLL180 is a circuit which generates the dot clock DCLK which synchronized with the horizontal synchronization data HD (HREF). This dot clock DCLK is a clock which makes a period spacing which divided periodic spacing of the horizontal synchronization data HD with the number of level dots. In addition, an operating condition required for actuation of PLL180 is controlled by the control signal PLLCNT mentioned later. The dot clock DCLK outputted from PLL is inputted into the delay circuit 134 with which the digital video processor 130 was equipped.

[0044] A delay circuit 134 outputs the sampling clock ADCLK with which the dot clock DCLK was delayed. This sampling clock ADCLK is a timing clock for changing the analog picture signals RA, GA, and BA into the digital image data RD, GD, and BD in ADC120. Therefore, a delay circuit 134 is a circuit for adjusting so that a sampling clock ADCLK may serve as optimal phase relation to the analog picture signals RA, GA, and BA, and obtaining the stable digital image data RD, GD, and BD. This adjustment is performed by the control signal DLCNT mentioned later.

[0045] CPU190 controls the operating condition of each component circuit so that an image display device operates corresponding to the display mode of a computer. There are [ a difference of a positive edge or a negative edge etc. ] a difference of a period and pulse width and synchronous timing in the horizontal synchronization data HD and the vertical-synchronization data VD with the display mode of a computer. Therefore, CPU190 distinguishes the display mode of a computer using these differences, and outputs the operating condition of each component circuit to the data control circuit 136 and clock control 136 which it has in the digital video processor 130.

[0046] The data control circuit 136 outputs a control signal DATCNT to the data-conversion circuit 132 based on the operating condition inputted from CPU190. Moreover, the clock control circuit 138 outputs a control signal PLLCNT to the PLL circuit 180, and outputs a control signal DLCNT to a delay circuit 134. Each circuit into which these control signals were inputted starts actuation by the operating condition corresponding to the display mode of a computer. [0047] Here, adjustment of the amount of delay of a delay circuit 134 can be performed as follows, for example. The adjustment volume which a user can change into an image display device is prepared, and looking at an image display condition, the adjustment volume is changed so that the most stable image display condition can be acquired. CPU190 determines an operating condition from the variation, and it outputs to the clock control circuit 138. The clock control circuit 138 outputs the control signal DLCNT according to the operating condition inputted from CPU190 to a delay circuit 134, and makes the amount of delay adjust. Moreover, it is possible not a user's hand regulation but to carry out automatically. In addition, adjustment volume can also be based on the below-mentioned adjustment function part 220.

[0048] The menu screen control section 200 is a control circuit which displays the menu screen which performs the various adjustments and conditioning in an image display device. The menu screen control section 200 generates the menu screen data OSD according to the directions from CPU190, and outputs them to the data-conversion circuit 132. At this time, the data-conversion circuit 132 compounds and



outputs menu screen data to the usual screen data, and a menu screen is displayed.

[0049] The infrared remote control (infrared remote-operation means) 210 has a migration carbon button (for example, a top, the bottom, the left, a rightward carbon button), a selection carbon button, etc. for moving the mouse pointer displayed on the display screen. Thereby, migration and selection assignment of a mouse pointer are performed, or the screen selection assignment is performed in the menu screen which performs a (mouse function) and various setup of an image display device (screen adjustment function). In addition, the infrared remote control according to the application of a mouse function and each screen adjustment function may be prepared separately.

[0050] The mouse function part 220 is a block which generates the mouse signal of a computer with the infrared signal by which outgoing radiation was carried out from the infrared remote control 210.

Moreover, the screen adjustment function part 230 is a block which generates a menu screen control signal and a screen selection signal with the infrared signal by which outgoing radiation was carried out from the infrared remote control 210. This invention has the description in these mouse function parts 220 and the screen adjustment function part 230, and adds explanation further below.

[0051] Drawing 2 shows the detail block diagram of the mouse function part 220 and the screen adjustment function part 230. The mouse function part 220 is equipped with the IR light sensing portion 222, a selector 224, the mouse I/F controller 226, and the mouse connector 228. Moreover, the screen adjustment function part 230 is equipped with the IR light sensing portion 232 and the user I/F controller 236. In addition, the IR light sensing portion 222 is equivalent to the 1st infrared light sensing portion of this invention, and the IR light sensing portion 232 is equivalent to the 2nd infrared light sensing portion. Moreover, a selector 224, the mouse I/F controller 226, and the mouse connector 228 are equivalent to the 1st signal generation section of this invention, and the user I/F controller 236 is equivalent to the 2nd signal generation section. Furthermore, a selector 224 is equivalent to the cutoff section of a light-receiving signal.

[0052] The power-source computers V and GND are supplied to the mouse connector 228 from the computer 10 through the interconnection cable 12. In the example of this invention, it is considering as the power source for operating each block 222 which constitutes the mouse function part 220 for these power-source computers V and GND, i.e., IR light sensing portion, a selector 224, and the mouse I/F controller 226 like illustration. Thereby, a power source is mostly supplied to each configuration section of the mouse function part 220 with a startup of a computer 10 at coincidence, and actuation becomes possible. At this time, the predetermined signal (there is a signal which usually notifies of the condition which can be operated) included in mouse data signal MSDATA is checked, and a computer 10 can check whether it is the condition which can be mouse operated. Therefore, it is possible for it not to be concerned with the existence of operation of an image display device, but to use a mouse function with a startup of a computer 10.

[0053] Next, actuation of the mouse function part 220 is explained. For example, in order to move the mouse pointer currently displayed on the screen, when the predetermined carbon button of the infrared remote control 210 is pushed, it is the infrared signal IR 1 for the mouse pointers from the infrared remote control 210. Outgoing radiation is carried out. The IR light sensing portion 222 is this infrared signal IR 1 for mouse pointers. Light is received and light-receiving signal IR1R is outputted. Light-receiving signal IR1R passes along the selector 224 controlled by the control signal S1 mentioned later, and is inputted into the mouse I/F controller 226. The mouse I/F controller 226 generates and outputs mouse data signal MSDATA for outputting to a computer 10 from light-receiving signal IR1R. Mouse data signal MSDATA is outputted to a computer 10 through an interconnection cable 12 from the mouse connector 228. A computer 10 makes migration of a mouse pointer reflect in the picture signal from a computer to an image display device according to mouse data signal MSDATA, and the mouse pointer on image display also moves it.

[0054] Here, the ID data signals ID0 and ID1 are inputted into the mouse connector 228 from the computer 10 through the interconnection cable 12, and these ID data signals ID0 and ID1 are inputted into the mouse I/F controller 226. Drawing 3 is the explanatory view showing an example in the mode of the mouse which corresponds in the mouse I/F controller 226. As for "L" shown in drawing, logical

level shows a low level, 0V [ for example, ]. Moreover, as for "H", logical level shows high level, 5V [ for example, ]. In the case of a low level, ID0 and ID1 correspond to a serial mouse, and, as for the mouse I/F controller 226, output the mouse data MSDATA corresponding to [ in ID0 / when ID1 is high-level ] a PS/2 (trademark of IBM) mouse at a low level. Moreover, ID0 is high-level, when ID1 is a low level, it corresponds to an ADB (Apple Desktop Bus (trademark of Apple Computer, Inc.)) mouse, and when ID0 and ID1 are high-level, the mouse data MSDATA corresponding to computer 98 (trademark of NEC Corp.) mouse are outputted. That is, mouse controller I/F226 detects the conditions of ID0 and ID1, and changes and outputs light-receiving signal IR1R to the mouse data MSDATA of the mouse interface corresponding to the mode of drawing 3 .

[0055] The screen adjustment function part 230 operates as follows. For example, starting of the menu screen for performing various setup is directed first. A push on the predetermined carbon button of the infrared remote control 210 carries out outgoing radiation of the infrared signal IR2a for screen adjustment which directs menu screen starting from the infrared remote control 210. The IR light sensing portion 232 receives this infrared signal IR2a for screen adjustment, and is light-receiving signal IR2aR. It outputs. Light-receiving signal IR2aR It is inputted into the user I/F controller 236. If the I/F controller 236 requests menu screen starting from CPU190 ( drawing 1 ), CPU190 directs a menu screen display to the menu screen control section 200 ( drawing 1 R> 1). The menu screen control section 200 to which the menu screen display was directed generates the menu screen data OSD, and outputs them to the data-conversion circuit 132 ( drawing 1 R> 1). The data-conversion circuit 132 outputs the image data which compounded the image and menu screen from a computer, and the display is performed. Next, various setup and the selections according to the menu screen by the screen adjustment function part 230 are performed. Like menu screen starting actuation, by pushing the predetermined carbon button of the infrared remote control 210, outgoing radiation of the infrared signal IR2b for screen adjustment is carried out from the infrared remote control 210, the IR light sensing portion 232 receives this, and this actuation is performed. A push on the predetermined carbon button of the infrared remote control 210 carries out outgoing radiation of the infrared signal IR2b for screen adjustment which directs selection, a setup, etc. of a menu screen from the infrared remote control 210. The IR light sensing portion 232 receives this infrared signal IR2b for screen adjustment, and is light-receiving signal IR2bR. It outputs. Light-receiving signal IR2bR It is inputted into the user I/F controller 236. If the I/F controller 236 requests selection and a setup of a menu screen from CPU190 ( drawing 1 ), CPU190 directs a menu screen display for the display according to it to the menu screen control section 200 ( drawing 1 ). The menu screen control section 200 to which the menu screen display was directed generates the menu screen data OSD, and outputs them to the data-conversion circuit 132 ( drawing 1 ). The data-conversion circuit 132 outputs the image data which compounded the image and menu screen from a computer, and the display is performed. Moreover, CPU190 controls the actuation according to the selection to coincidence.

[0056] Infrared signal IR 1 received by the IR light sensing portion 222 here Infrared signal IR 2 by which outgoing radiation was carried out from the infrared remote control 210 since the infrared signal IR 2 (IR2a and IR2b) received by the IR light sensing portion 232 was infrared radiation (for example, in order to operate the screen adjustment function part 230) The IR light sensing portion 222 will receive light. By this, the mouse I/F controller 226 will output mistaken mouse data signal MSDATA, and a computer 10 will perform mistaken mouse pointer control. Then, when adjusting by starting a menu screen which was mentioned above, in order to prevent this mistaken actuation, from the user I/F controller 236, a control signal S1 is outputted to a selector 224, and mistaken light-receiving signal IR1R is intercepted. Since mistaken light-receiving signal IR1R is not inputted into the mouse I/F controller 226 by this, generating of mistaken mouse data signal MSDATA can be prevented.

[0057] In addition, you may make it intercept light-receiving signal IR1R according to signals other than the starting signal of a menu screen. Moreover, while performing the mouse function, you may make it intercept light-receiving signal IR2R for screen adjustment contrary to an above-mentioned case. That is, you may make it prepare the signal invalid section which makes an invalid alternatively two one side, light-receiving signal IR1R and IR2R, generally according to a certain predetermined signal. If it carries

out like this, while performing one function, it is able to make it for the function of another side not to work.

[0058] This invention can be carried out in various modes in the range which is not restricted to an above-mentioned example or an above-mentioned operation gestalt, and does not deviate from that summary.

[0059] (1) For example, although this example explains the case of the remote-operation means by infrared radiation to an example, it is not necessary to limit it to this. The same effectiveness can be acquired even if it is the case of the actuation means connected by the cable, and the remote-operation means by wireless. Moreover, as an actuation means, you may be the pointing device, and not only infrared remote control but the keyboard represented by the mouse, and various input means in addition to this.

[0060] (2) Moreover, although this example explains the projection mold display to an example, it is not necessary to limit it to this, and it can be applied also to common image display devices, such as a liquid crystal image display device.

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to an image display device equipped with a remote-operation means to transmit the input to a computer especially using infrared radiation, about the image display device which displays the image outputted from a computer.

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EFFECT OF THE INVENTION

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[The means for solving a technical problem, and its operation and effectiveness] In order to solve a part of above-mentioned technical problem [ at least ], the 1st invention With the 1st receive section which receives the 1st actuation signal outputted from an actuation means to be the image display device which displays the picture signal outputted from a computer using a liquid crystal panel, and to output predetermined information The 1st signal generation section which creates and outputs the 1st signal which tells said computer from the 1st input signal which received in said 1st receive section, The power source of a preparation, said 1st receive section, and said 1st signal generation section is characterized by constituting and becoming so that it may be supplied from said computer through the cable which connects said computer and said image display device.

[0007] Since the power source of said 1st receive section and said 1st signal generation section is the configuration supplied from a computer, the 1st receive section and the 1st signal generation section are not concerned with the existence of operation of an image display device, but are that said 1st receive section and said 1st signal generation section can also be operated with a startup of a computer. Therefore, the image display device which makes usable the actuation means for not being concerned in order of an equipment startup, but inputting information into a computer can be offered.

[0008] The 1st above-mentioned invention You may make it have the 2nd signal generation section which creates and outputs the 2nd signal used within said image display device from the 2nd input signal which received in the 2nd receive section which receives further the 2nd actuation signal outputted from said actuation means, and said 2nd receive section.

[0009] According to the above-mentioned configuration, the 2nd signal used within an image display device from the 2nd input signal which received in the 2nd receive section is generable. For example, this 2nd signal can be used as a control signal of the menu screen which sets up the operating condition of an image display device etc.

[0010] You may make it said actuation means of the 1st invention be a remote-operation means.

[0011] If it carries out like this, since an actuation means will be remote operation, a user-friendly image display device is realizable.

[0012] Moreover, you may make it the 1st actuation signal and the 2nd actuation signal which are outputted from said remote-operation means be an infrared signal.

[0013] If it carries out like this, since the actuation signal outputted from a remote-operation means will be infrared radiation, an image display device is realizable with a simple configuration.

[0014] It is desirable to have the signal invalid section which makes an invalid one side of said 1st or 2nd input signal based on a further predetermined signal in the above-mentioned case.

[0015] A remote-operation means by which an actuation signal is infrared radiation

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] Usually, when it confirms whether the mouse is connected at the time of an equipment startup and connection is able to be checked, a computer performs initial setting so that the mouse can be used. The following troubles occur in the mouse function by the above configurations.

[0004] Since the image display device will not have started a computer yet although it performs the connection confirm of the mouse for image display devices at the time of the initialization if a startup of a computer is started in the condition that the image display device has not started yet, it will be recognized as the mouse for image display devices not being connected effectually. Therefore, since a computer does not perform initial setting which makes a mouse usable, even if it starts an image display device after that, it cannot use the mouse function of an image display device. For this reason, when using the image display device which has such a mouse function, the sequence [ image display device / a computer and ] of an equipment startup will be limited, and an improvement was desired in respect of user-friendliness. Such a problem was a problem common to the actuation means not only a means to have a mouse function but for, generally inputting a certain information into a computer.

[0005] This invention is made in order to solve the above-mentioned technical problem in the conventional technique, and it aims at offering the image display device which makes usable the actuation means for not being concerned in order of an equipment startup, but inputting information into a computer.

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MEANS

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The infrared radiation by which outgoing radiation was carried out towards one of the 1st or 2nd receive section from the (infrared remote-operation means) also irradiates the receive section of another side, and may generate an input signal. And the 1st or 2nd signal generated from this input signal will cause malfunction of equipment. For example, the 2nd actuation signal (infrared signal) by which outgoing radiation was carried out towards the 2nd receive section from the infrared remote-operation means also irradiates the 1st receive section, and generates the 1st input signal. By this, the 1st signal will be generated in the 1st signal generation section, it will be outputted to a computer, and malfunction of a computer will be caused. Since the input signal generated in the receive section of another side can be made into an invalid according to the above-mentioned configuration, such malfunction can be prevented.

[0016] Moreover, when said 2nd signal is used in said image display device, as for said signal invalid section, it is desirable to repeal said 1st input signal.

[0017] The 1st input signal generates the 1st signal in the 1st signal generation section, and is outputted to a computer. This 1st signal is used as information, such as positional information and screen selection information, in a computer. Therefore, when the 1st input signal is accidentally outputted from the 1st receive section by the 2nd infrared signal, the 1st signal generated in the 1st signal generation section will be outputted to a computer, and will cause malfunction in a computer. Since the 1st signal generated accidentally is not outputted to a computer according to the above-mentioned configuration, malfunction in a computer can be prevented.

[0018] Moreover, as for said 1st signal generation section, in the 1st above-mentioned invention, it is desirable to output said 1st signal to said computer outputted from said computer by the signal of the format corresponding to said computer based on the information on a proper.

[0019] If it carries out like this, based on the information on the proper outputted from the computer connected to an image display device, the 1st signal can be automatically made into the signal of the format corresponding to a computer.

[0020] In the image display device connected with a computer by the cable, it is characterized by having the circuit section which outputs a connection signal to said computer while current supply of the 2nd invention is carried out from said computer through said cable.

[0021] Since current supply of the circuit section which outputs a connection signal is carried out to a computer from a computer through a cable according to the 2nd invention, it cannot be concerned with the existence of operation of an image display device, but a connection signal can be outputted to a computer. Therefore, the image display device which is not concerned in order of equipment starting, but makes a connection signal usable can be offered.

[0022] As for said circuit section, in the 2nd above-mentioned invention, it is desirable to connect with the mouse terminal of said computer through said cable.

[0023] If it carries out like this, the mouse function of a computer is realizable with the connection signal outputted from the circuit section.

[0024] Moreover, as for said circuit section, in the 2nd above-mentioned invention, it is desirable to



have the receive section which receives the signal from the remote control for image display devices, and to have the control section which emulates the mouse function of said computer with the signal from said remote control for image display devices.

[0025] If it carries out like this, the signal from the remote control for image display devices can be emulated to the signal corresponding to the mouse function of a computer to connect through a cable.

[0026] Moreover, as for said circuit section, in the 2nd above-mentioned invention, it is still more desirable to have the means which changes the 1st remote control signal which operates an image display device by remote control, and the 2nd remote control signal which operates the mouse function of a computer by remote control.

[0027] If it carries out like this, only one of the signals of the 1st remote control signal and the 2nd remote control signal are confirmed, and it can choose whether an image display device is operated by remote control with the 1st remote control signal, or the mouse function of a computer is operated by remote control with the 2nd remote control signal.

[0028] In the image display device connected with the mouse terminal of a computer by the cable, 3rd invention is characterized by having a means to output a mouse functional connection signal to said computer through said cable, when said computer starts.

[0029] Since according to the 3rd invention a mouse functional connection signal can be outputted to a computer through a cable when a computer starts, a computer can be recognized as a mouse function being usable. Therefore, the image display device which is not concerned in order of equipment starting, but makes a mouse function usable can be offered.

[0030] In the image display system which the 4th invention is an image display system and comes to have the image display device connected with a computer and this computer by the cable, and the remote controller which operates this image display device by remote control While current supply of said image display device is carried out from said computer It is characterized by having a means to output a connection signal to said computer, a means to receive the signal from said remote controller, and the control means that emulates the mouse function of said computer with the signal from said remote controller.

[0031] Since current supply of a means with which said image display device is equipped output a connection signal to a computer, a means receive the signal from a remote controller, and the control means which emulates the mouse function of said computer with the signal from a remote controller is carried out from a computer according to the 4th invention, it cannot be concerned with the existence of operation of an image display device, but it can operate, and the signal from a remote controller can be emulated to the signal corresponding to the mouse function of a computer, and can output to a computer. Therefore, the image display system which is not concerned in order of equipment starting, but makes a mouse function usable can be offered.

[0032] 5th invention is characterized by having a means by which this image display device outputs the signal to which power-source OFF also makes usable said mouse function for computers of said remote control by power-source ON of a computer in the image display device operated by remote control with the remote control which has a mouse function for computers.

[0033] According to the 5th invention, an image display device can offer the image display device to which it is not concerned in order of an equipment startup, either, but makes a mouse function usable by power-source ON of a computer since power-source OFF can also make usable the mouse function for computers of remote control.

[0034]

[Embodiment of the Invention] Next, the gestalt of operation of this invention is explained based on an example. Drawing 1 is the block diagram showing the circuitry of the projection mold indicating equipment (image display device) by the example of this invention.

[0035] This image display device is equipped with the video amplifier 110 of three channels, ADC120 of three channels, the digital video processor 130, DA converter (it abbreviates to DAC hereafter) 140 of three channels, three liquid crystal (it abbreviates to LCD hereafter) drivers 150R, 150G, and 150B, driver control circuits 155, three LCD panels 160R, 160G, and 160B, the synchronous detector 170, the

PLL circuit 180, and CPU190.

[0036] The analog picture signals RIN (red), GIN (green), and BIN (blue) from a computer are first inputted into the video amplifier 110 of three channels. Video amplifier 110 changes the amplitude and direct current level of the analog picture signals RIN, GIN, and BIN, and outputs them as analog picture signals RA, GA, and BA according to the input specification of ADC120 connected to the latter part.

[0037] ADC120 is the timing of the sampling clock ADCLK mentioned later, and changes and outputs the inputted analog picture signals RA, GA, and BA to the digital image data RD, GD, and BD. Here, although the conversion precision of the changed digital image data RD, GD, and BD changes with foreground colors to which image display corresponds, it is usually about 3-8 bits, respectively. The digital image data RD, GD, and BD are inputted into the data-conversion circuit 132 in the digital video processor 130.

[0038] The data-conversion circuit 132 once carries out the buffer (storage) of the inputted digital image data RD, GD, and BD, and outputs the digital LCD data RDT, GDT, and BDT changed into the clock frequency (set up by the control signal DATCNT mentioned later) which can be displayed on the LCD panels 160R, 160G, and 160B. The LCD data RDT, GDT, and BDT are inputted into DAC140.

[0039] DAC140 changes and outputs the inputted LCD data RDT, GDT, and BDT to the LCD signals RAT, GAT, and BAT of an analog again. The LCD signals RAT, GAT, and BAT are inputted into each LCD drivers 150R, 150G, and 150B.

[0040] The LCD drivers 150R, 150G, and 150B are controlled by the timing clock LCDCLK outputted from the driver control circuit 155, and change and output the inputted LCD signals RAT, GAT, and BAT to the LCD drive data RATD, GATD, and BATD which drive each LCD panels 160R, 160G, and 160B. Here, the driver control circuit 155 generates the timing clock LCDCLK for the LCD drivers 150R, 150G, and 150B to output the LCD drive data RATD, GATD, and BATD to each LCD panels 160R, 160G, and 160B based on timing signal LCDTRG which shows the timing of the LCD data RDT, GDT, and BDT outputted from the data-conversion circuit 132.

[0041] Each LCD panels 160R, 160G, and 160B modulate the light of each color by which incidence was carried out to each LCD panels 160R, 160G, and 160B according to the inputted LCD drive data RATD, GATD, and BATD. In addition, the light of each color by which incidence was carried out to each LCD panels 160R, 160G, and 160B is the light by which outgoing radiation was carried out from the light source which is not illustrated. Each modulated colored light is compounded by one, and with the projector lens which does not form and illustrate an image, it is projected on a screen, and an image is expanded and it is displayed.

[0042] Vertical Synchronizing signal Vsync showing Horizontal Synchronizing signal Hsync and the vertical synchronous timing which, on the other hand, express the horizontal synchronous timing of the picture signal from a computer is inputted into the synchronous detector 170. The synchronous detector 170 shapes Horizontal Synchronizing signal Hsync and Vertical Synchronizing signal Vsync in waveform, and outputs the horizontal synchronization data HD and the vertical-synchronization data VD. The horizontal synchronization data HD and the vertical-synchronization data VD are inputted into the above-mentioned data-conversion circuit 132 and CPU190, and are used as data timing until the buffer of the digital image data RD, GD, and BD is carried out to the above-mentioned data-conversion circuit 132.

[0043] PLL180 is a circuit which generates the dot clock DCLK which synchronized with the horizontal synchronization data HD (HREF). This dot clock DCLK is a clock which makes a period spacing which divided periodic spacing of the horizontal synchronization data HD with the number of level dots. In addition, an operating condition required for actuation of PLL180 is controlled by the control signal PLLCNT mentioned later. The dot clock DCLK outputted from PLL is inputted into the delay circuit 134 with which the digital video processor 130 was equipped.

[0044] A delay circuit 134 outputs the sampling clock ADCLK with which the dot clock DCLK was delayed. This sampling clock ADCLK is a timing clock for changing the analog picture signals RA, GA, and BA into the digital image data RD, GD, and BD in ADC120. Therefore, a delay circuit 134 is a circuit for adjusting so that a sampling clock ADCLK may serve as optimal phase relation to the analog

picture signals RA, GA, and BA, and obtaining the stable digital image data RD, GD, and BD. This adjustment is performed by the control signal DLCNT mentioned later.

[0045] CPU190 controls the operating condition of each component circuit so that an image display device operates corresponding to the display mode of a computer. There are [ a difference of a positive edge or a negative edge etc. ] a difference of a period and pulse width and synchronous timing in the horizontal synchronization data HD and the vertical-synchronization data VD with the display mode of a computer. Therefore, CPU190 distinguishes the display mode of a computer using these differences, and outputs the operating condition of each component circuit to the data control circuit 136 and clock control 136 which it has in the digital video processor 130.

[0046] The data control circuit 136 outputs a control signal DATCNT to the data-conversion circuit 132 based on the operating condition inputted from CPU190. Moreover, the clock control circuit 138 outputs a control signal PLLCNT to the PLL circuit 180, and outputs a control signal DLCNT to a delay circuit 134. Each circuit into which these control signals were inputted starts actuation by the operating condition corresponding to the display mode of a computer. [0047] Here, adjustment of the amount of delay of a delay circuit 134 can be performed as follows, for example. The adjustment volume which a user can change into an image display device is prepared, and looking at an image display condition, the adjustment volume is changed so that the most stable image display condition can be acquired. CPU190 determines an operating condition from the variation, and it outputs to the clock control circuit 138. The clock control circuit 138 outputs the control signal DLCNT according to the operating condition inputted from CPU190 to a delay circuit 134, and makes the amount of delay adjust. Moreover, it is possible not a user's hand regulation but to carry out automatically. In addition, adjustment volume can also be based on the below-mentioned adjustment function part 220.

[0048] The menu screen control section 200 is a control circuit which displays the menu screen which performs the various adjustments and conditioning in an image display device. The menu screen control section 200 generates the menu screen data OSD according to the directions from CPU190, and outputs them to the data-conversion circuit 132. At this time, the data-conversion circuit 132 compounds and outputs menu screen data to the usual screen data, and a menu screen is displayed.

[0049] Infrared remote control

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The block diagram showing the circuitry of the projection mold indicating equipment (image display device) by the example of this invention.

[Drawing 2] The block diagram showing the detail of the mouse function part of this invention, and a screen adjustment function part.

[Drawing 3] The explanatory view showing an example in the mode of the mouse which corresponds in the mouse I/F controller 226.

[Description of Notations]

10 -- Computer  
12 -- Interconnection cable  
110 -- Video amplifier  
120 -- ADC  
130 -- Digital video processor  
132 -- Data-conversion circuit  
134 -- Delay circuit  
136 -- Data control circuit  
138 -- Clock control circuit  
140 -- DAC  
150R, 150G, a 150 B--LCD driver  
155 -- Driver control circuit  
160R, 160G, a 160 B--LCD panel  
170 -- Synchronous detector  
180 -- PLL circuit  
190 -- CPU  
200 -- Menu screen control section  
210 -- Infrared remote control  
220 -- Mouse function part  
222 -- IR light sensing portion  
224 -- Selector  
226 -- Mouse I/F controller  
228 -- Mouse connector  
230 -- Screen adjustment function part  
232 -- IR light sensing portion  
236 -- User I/F controller  
ADCLK -- Sampling clock  
DATCNT -- Control signal  
DCLK -- Dot clock  
DLCNT -- Control signal

HD -- Horizontal synchronization data  
Hsync -- Horizontal Synchronizing signal  
IR1R -- Light-receiving signal  
IR1 -- Infrared signal  
IR2aR -- Light-receiving signal  
IR2a -- Infrared signal for adjustment  
IR2bR -- Light-receiving signal  
IR2b -- Infrared signal for adjustment  
IR2 -- Infrared signal  
IR2R -- Light-receiving signal  
LCDCLK -- Timing clock  
LCDTRG -- Timing signal  
MSDATA -- Mouse data signal  
OSD -- Menu screen data  
PCV, GND -- Power source  
PLLCNT -- Control signal  
RA, GA, BA -- Analog picture signal  
RATD, GATD, BATD--LCD drive data  
RD, GD, BD -- Digital image data  
RDT, GDT, BDT--LCD data  
RIN, GIN, BIN -- Analog picture signal  
S1 -- Control signal  
VD -- Vertical-synchronization data  
Vsync -- Vertical Synchronizing signal

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[Translation done.]

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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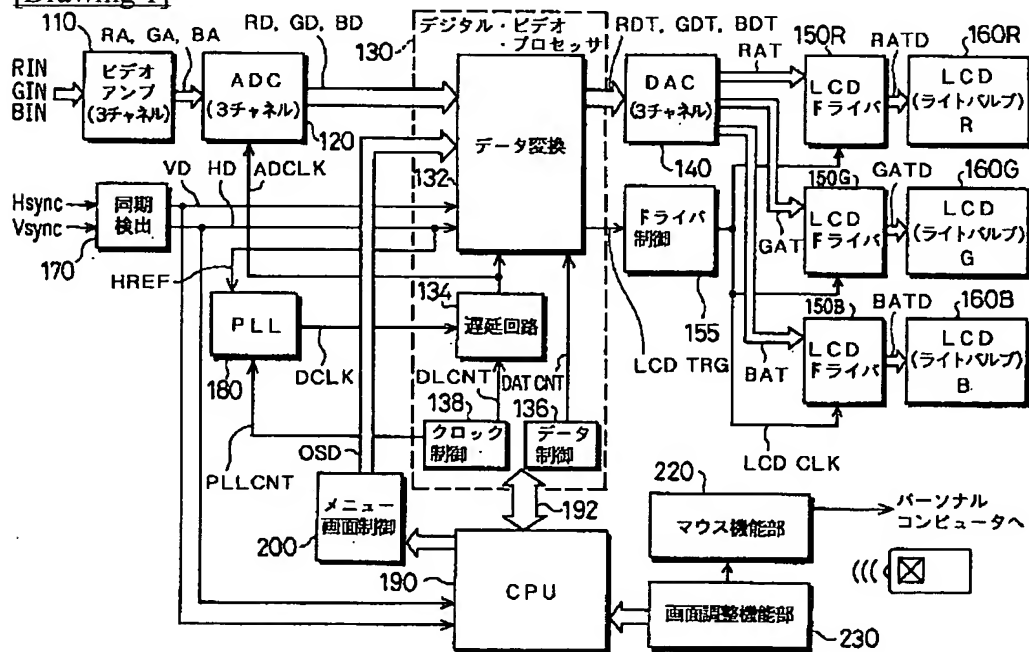
## DRAWINGS

[Drawing 3]

| モード     | ID0 | ID1 |
|---------|-----|-----|
| シリアルマウス | L   | L   |
| PS/2    | L   | H   |
| ADB     | H   | L   |
| PC98    | H   | H   |

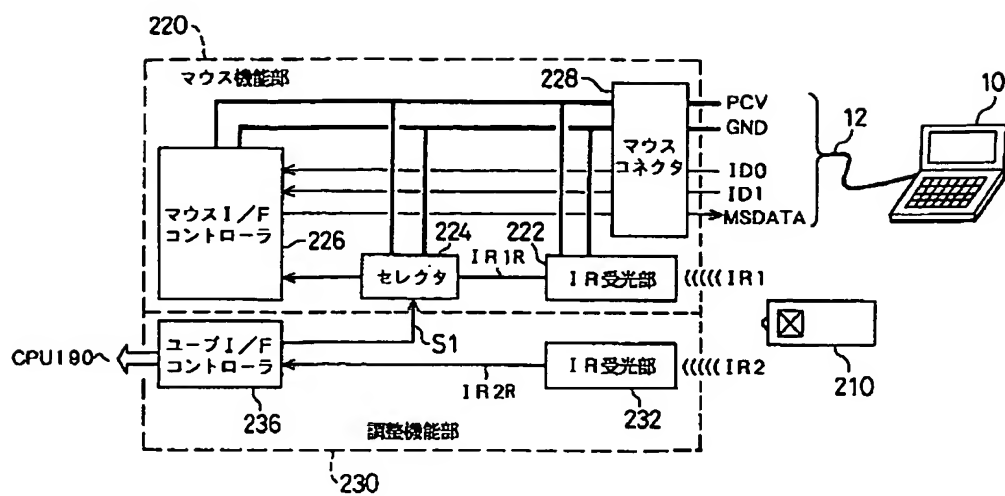
H: 5V, L: 0V

[Drawing 1]



[Drawing 2]





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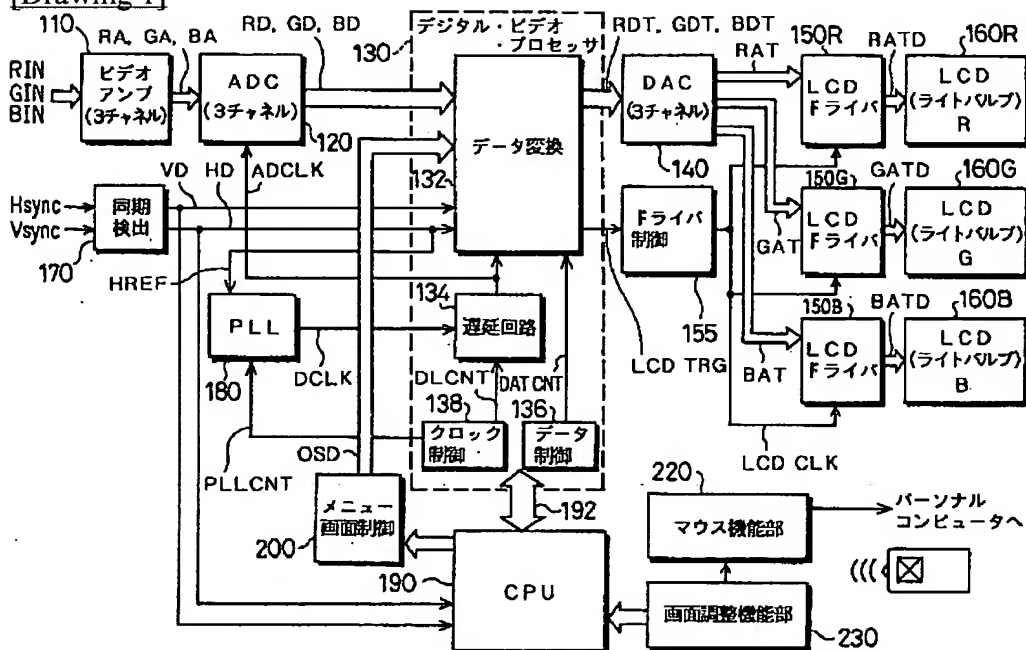
## DRAWINGS

[Drawing 3]

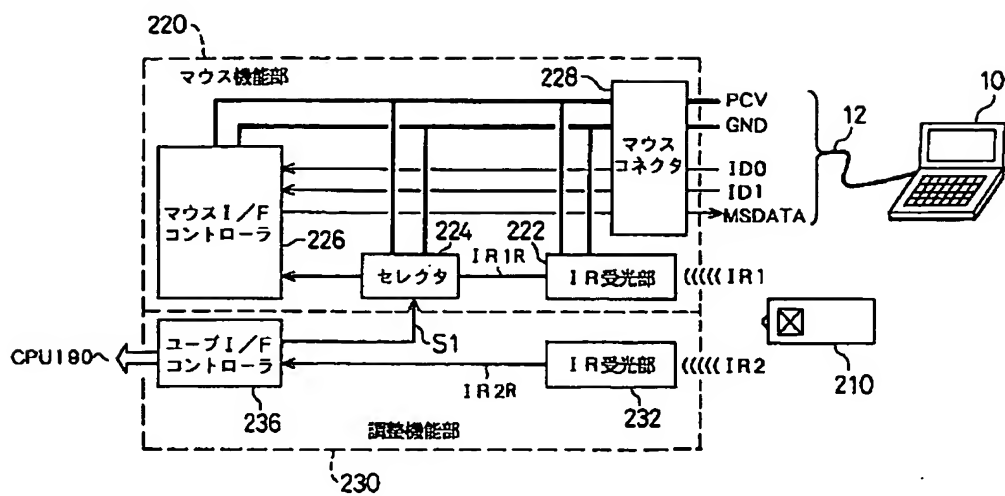
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|---------|-----|-----|
| シリアルマウス | L   | L   |
| PS/2    | L   | H   |
| ADB     | H   | L   |
| PC98    | H   | H   |

H: 5V, L: 0V

[Drawing 1]



[Drawing 2]



[Translation done.]